New Zealand pigmyweed

(Crassula helmsii)

Managing colonisation of a town pond by New Zealand pigmyweed in Luré (Loire department)

The Loire department

■ The Loire department has set up a strategy to combat invasive alien plants, focussing on three priority species (ragweed, Asian knotweed and alien water primrose) and a small number of emergent plant species. The latter are species that have been observed, but have only one or very few populations in France. Elimination is thought to be possible if immediate action is undertaken. A status report on alien species in the department was produced in 2014 by the National Botanical Conservatory for the Massif Central (CBNMC) and served to identify the emerging species. Among those species, six were selected for monitoring and management work in view of their eradication, including New Zealand pigmyweed.

■ In 2017, the department and the Loire Departmental Territorial Directorate (DDT), in conjunction with the CBNMC and the Monts du Pilat Centre for Environmental Initiatives (CPIE), the manager of the Centre for Invasive Plants, met with elected officials from the town of Luré to set up the project to eliminate the only colony of New Zealand pigmyweed in the department.

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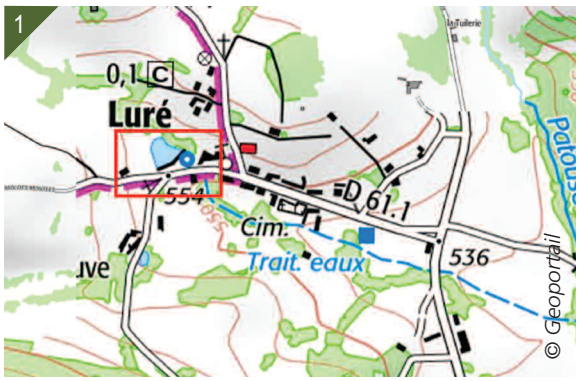
Intervention site

■ The pond colonised by New Zealand pigmyweed is located in the town of Luré, in fact a village with 146 inhabitants and a member of the Vals d'Aix et d'Isable intermunicipal board.

■ The pond was created in 1999 very close to the centre of the village. It covers a surface area of 1 990 square metres and has an average depth of one metre. It receives the run-off water from the catchment. Water exits the pond either directly through a ditch linked to the Patouse River, located approximately 850 metres from the pond, or via the town wash house and then to the ditch.



1. Map showing the pond in the town of Luré.

■ The pond is used for fishing and as a reservoir in case of fire.

■ The CBNMC first observed *Crassula helmsii* in the pond in 2006. The plants progressively colonised the edge of the pond, spreading from approximately 5 square metres in 2013 to over 350 square metres in 2017.

■ It is unknown how the plants first arrived in the natural environment. They may have come in when the site was planted, however the current managers are unaware of how that might have happened.

■ The pond in Luré is one of three sites in the Rhône-Alpes region where the species has been observed. The other sites are in Decines-Charpieu in the Rhône department and Niévroz in the Ain department.

Disturbances and issues involved

■ New Zealand pigmyweed is considered a priority among the emerging invasive alien species (IAS) in the department due to its highly invasive nature and its rapid spread in other areas, notably in western France.

■ It can form dense, single-species beds that hinder the development of native plant species and disturb the ecological balance of the local environment.

■ The pigmyweed developed in separate clumps along the banks of the pond. However, the development of a thick mat of plants along the edge of a pond could reduce its

recreational value and constitute a risk for young children. It could also block the wash house and the ditch.

■ The species could be disseminated by humans (on boots, via fishing equipment, etc.), dogs and wild animals (notably birds) to the basin of the Aix River. It could also disperse naturally to new sites downstream of the pond.

Interventions

■ Elimination of the plants from the site to avoid dispersal was considered feasible given the small size of the population.

■ Meetings were organised in 2017 and 2018 with the town of Luré, the Loire department, the Loire DDT, the CBNMC and the Vals d'Aix et d'Isable intermunicipal board (the entity in charge of the river contract) to prepare and organise the intervention.

■ It was decided to empty and dredge the pond. The work was done in the spring and autumn of 2018.

■ Complete draining of the pond

■ In order to avoid dispersal of any plant fragments and reduce the impact of draining on the river (e.g. suspended solids), the town wash house was used as an initial settling basin. Bales of straw were placed at the entry point in the wash house and a foam filter was placed on the overflow channel. A second concrete basin located just before the ditch was used as a second settling basin. Three successive filters (two made of straw and one foam filter) were positioned in the second basin. All the straw filters were replaced during the emptying process to avoid clogging. The filters were in place throughout the operation until the dredging was completed. The wash house and the second basin were emptied and cleaned at the end of the operation.

■ To avoid clogging the filters and maintain their filtering capacity, the discharge rate during emptying was kept to a low level. The fish in the pond were caught with nets and taken to the local rendering service. Boots and fishing equipment were cleaned after use.

■ Dredging of the pond

■ The pond and the edges where the species was present were dredged to a depth of 50 to 70 centimetres. The input culvert to the pond was also cleaned.

■ The work was carried out by a private company and involved two tracked excavators and a dump truck for six days. The movements of the machines were precisely determined and the dredging took place from the outer edges to the middle to avoid dispersal of the pigmyweed.

■ Precautions

■ A number of precautions were taken during dredging to avoid dispersal of plant fragments. Information on the plant species, the operational process and the precautions required during the work was supplied to the company before the start of the project in order to inform the intervention personnel. During the dredging, the excavators, which served exclusively for dredging, avoided running over colonised areas as much as possible. All the machines and equipment used for the work were cleaned with a high-pressure cleaner on a specific site. A single entry and exit point to the pond for the machines was set up to limit the risks of transporting plants and/or seeds to other areas. A "clean" access ramp was created for filling the dump truck and the soil used for the ramp was later removed with the dredged soil.

2a, b and c. Red lines showing the position of the pigmyweed in the pond on 2014.
3a and b. Filters installed in the ditch (a) and the wash house (b).

Results and costs

Results

A total of 1 000 cubic metres of soil potentially containing fragments of pigmyweed were removed. The entire area colonised by the pigmyweed was cleaned.

A relatively low water level was observed over the first year of monitoring. The steep banks of the pond (a drop of approximately 60 centimetres) hinder the rapid recolonisation of vegetation. The grass and moss storeys cover 5 to 10% of surfaces in spots. Some flatter areas have formed at the bottom of the banks due to erosion (small landslides). It would appear that colonisation by the pigmyweed cannot proceed top-down because the conducive substrate was removed wherever the pigmyweed was present. The swards around the pond are not favourable for pigmyweed because the substrate is too dry and the vegetation is too dense.

Many species with different ecological preferences have been observed along the banks of the pond, including *Carex hirta*, *Equisetum arvense*, *Equisetum palustre*, *Gallium mollugo*, *Juncus bulbosus*, *Lotus corniculatus*, *Mentha aquatica*, *Polygonum aviculare*, *Ranunculus repens*, *Sagina apetala*, *Veronica beccabunga* and *Physcomitrium pyriforme*.

Costs

The Loire department provided the town with technical and administrative assistance.

The work involved two people to install the filters, clean the basins and install tarps, for a total of one day, and four people for the dredging over six days.

During emptying of the pond, the different project partners regularly monitored the progress, checking the filters and the overall situation.

During the work on-site, three monitoring meetings were organised.

The total cost of the operation amounted to 14 745.10 euros (not including VAT). The town received 8 809.12 euros in financial aid from the Regional Environmental Directorate and 2 986.87 euros from the Loire department. The town supplied the remainder, 2 949.11 euros, from its own budget.

Fishing is now prohibited on the site.

Information on the project

The project was the topic of an article published in the bulletin of the Centre for Invasive Plants and sent to managers of natural areas and policy officers for invasive plants in the Loire department.

A one-day training course on invasive plants, including a visit to the site, was organised prior to the work on 19 October 2017 for the personnel and elected officials of local governments.

A meeting of policy officers for invasive plants in the Loire department, including

4. The pond during emptying.
5. Removal of the fish from the pond.
6a and b. Dredging.

a visit to the site, was organised on 21 November 2018, following the dredging work.

- An article on the project was published on the CBNMC site.
- Other forms of dissemination are currently being assessed.

Outlook

- Two annual monitoring visits, in June-July and in September-October, are planned for at least five years to assess the effectiveness of the intervention. Each visit, requiring four to five hours for a complete inspection, checks for the presence of the species in the pond and nearby (around the pond, the zone upstream, the zone downstream of the wash house, around a pool in the meadow). Searches were run on the stream downstream of the pond to determine whether the species had disseminated. No pigmyweed was found during the first monitoring visit at the end of 2019.
- Plans have been made to tarp areas where the pigmyweed reappears, given that the species does not like shaded areas. A small ditch, 20 to 30 cm deep, will be dug around the colonised area to secure the tarp.
- The landscape around the pond was somewhat altered by the intervention. Work to consolidate the banks and/or enhance the landscape may be decided, taking all the necessary precautions.

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7. Mound of extracted soil.
8. The emptied pond.
9. The pond after the work.

For more information...

- CBNMC article: https://www.cbnmc.fr/actualites/144-la-crassule-de-helms-maitrisee-dans-le-de-partement-de-la-loire
- Article in the Pays newspaper: http://static1.le-pays.fr/lure-42260/actualites/plan-deau-un-curage-necessaire-pour-supprimer-une-plante-invasive_13044514/

This management report fills out the collection already published in the second and third volumes of the book titled "Invasive alien species in aquatic environments, Practical knowledge and management insights", in the Knowledge for action series published by the French Biodiversity Agency.
(http://especes-exotiques-envahissantes.fr/best-practices-guide/?lang=en).